

REMARKS

I. Introduction

By the present Amendment, claims 16, 17, 31-40, 55, 56, 59-73, and 113-118 have been canceled. Accordingly, claims 120-122, 124-126, 128, and 129 remain pending in the application. Claims 128 and 129 are independent.

II. Office Action Summary

In the Office Action of July 28, 2006, claims 120-122 and 128 were rejected under 35 USC §102(b) as being anticipated by Sen. Claims 120-122, 124-126, 128, and 129 were rejected under 35 USC §103(a) as being unpatentable over Sen. These rejections are respectfully traversed.

III. Prior Rejections and Responses

Applicants respectfully submit that all previous rejections have been fully addressed and traversed. The instant Office Action withdraws the rejections grounded on O'Shea, and applies Sen to reject the claims. The Examiner has not addressed Applicants' arguments traversing the rejections based on O'Shea.

In accordance with the USPTO Policy, the MPEP §707.07(f) states, "where the requirements are traversed, or suspension thereof requested, the examiner should make proper reference thereto in his or her action on the amendment. Where the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of it." More particularly, MPEP §707.07(f) states in relevant *verbatim*, "The importance of answering applicant's arguments is illustrated by *In re Herrmann*, 261 F.2d 598, 120 USPQ 182 (CCPA 1958) where the applicant urged that the subject matter claimed

produced new and useful results. The court noted that since applicant's statement of advantages was not questioned by the examiner or the Board of Appeals, it was constrained to accept the statement at face value and therefore found certain claims to be allowable. See also *In re Soni*, 54 F.3d 746, 751, 34 USPQ2d 1684, 1688 (Fed. Cir. 1995) (Office failed to rebut applicant's argument)." Since the Examiner has not responded to Applicants' arguments and statements traversing the rejection of claims over the previously applied art, Applicants respectfully submit that the Examiner has acquiesced to Applicants' reasons for patentability over those references.

IV. Rejections under 35 USC §102

Claims 120-122 and 128 were rejected under 35 USC §102(b) as being anticipated by Sen. Regarding this rejection, the Office Action generally alleges that Sen sets forth a method and apparatus for optimizing fermentation media for maximization of surfactin production, without specifically identifying where Sen discloses each feature of the claimed invention. The Office Action indicates that Sen utilizes a carbon source (glucose), a nitrogen source (ammonium nitrate), and mineral salts (ferrous and manganous sulphates) in a 2^4 full factorial central composite experimental design while allowing possible interactions between the four components. The Office Action alleges that surfactin was assayed by an indirect method that involves measurement of surface tensions of diluted broth samples. Optimum values for the tested variables given maximum production of surfactant were determined from multiple rounds of media cultures and fitted to a regression equation. Applicants respectfully disagree.

Independent claim 128 defines an apparatus for identifying a culture medium component that comprises:

means for identifying a predetermined set of test compounds;

means for parameterizing said predetermined set of test compounds by determining at least one parameter for each test compound in said predetermined set of test compounds;

means for performing a space-filling design of the parameterized predetermined set of test compounds to identify a plurality of first test compounds, wherein said plurality of first test compounds is a subset of said predetermined set of test compounds;

means for constructing a first test library containing a plurality of first culture media, each said first culture media containing a respective first test compound identified using said space-filling design;

means for deriving a quantitative relationship between a measured indicia of a property of said plurality of first culture media and at least one parameter of said plurality of first test compounds;

means for identifying a candidate library containing a plurality of candidate culture media having an estimated indicia that satisfies a test requirement, wherein each said candidate culture medium contains a respective test compound from said predetermined set of test compounds that is not in said first test library, and wherein said estimated indicia is calculated using said derived quantitative relationship; and

means for identifying a second test library containing candidate culture media having a measured indicia that satisfies said test requirement.

According to the invention defined by independent claim 128, means are provided for identifying a predetermined set of test compounds. The test compounds (from the predetermined set of test compounds) are parameterized through determination of at least one parameter that is present in each test compound. A space-filling design is then performed for the parameterized test compounds. This results in identification of a plurality of first test compounds that is a subset of the predetermined set of test compounds. A first test library is constructed to include a plurality of first culture media. Each of the first culture medium contains at least one

first test compound identified using the space-filling design. Next, the apparatus derives a quantitative relationship between a measured indicia of the first culture media and at least one parameter of the first test compounds. Means are provided for identifying a candidate library containing a plurality of candidate culture media. The candidate culture media each have an estimated indicia that satisfies a test requirement. The estimated indicia is calculated using the derived relationship. The candidate culture media are also selected such that their estimated indicia meet a test requirement. Each candidate culture medium contains at least one test compound that is not in the first test library. Finally, means are provided for identifying a second test library including second culture media having a measured indicia that satisfies the test requirement.

The foregoing claim summary is provided for the Examiner's convenience. It is submitted, however, that all descriptions of Applicants' disclosed and claimed invention, and all descriptions and rebuttal arguments regarding the art of record, as previously submitted in any form, are repeated and incorporated herein by reference. Further, all Office Action statements regarding the prior art rejections are respectfully traversed. As additional arguments, Applicant respectfully submits the following.

At this point, the undersigned would like to respectfully note for the record (in the event of an appeal), the nominal nature of the comments/guidance provided in Office Actions to date in connection with the instant invention. This guidance has been substantially limited to generalizations regarding the prior art and predisposition non-patentability that appears to be predicated on hindsight. Applicants respectfully request more substantial comments/guidance from the Examiner, as required by U.S. patent law as follows. More particularly, attention is directed to the decision of

the Board of Patent Appeals and Interferences in *Ex parte Levy*, 17 USPQ2d 1461 (1990), at 1462 where the Board states:

The factual determination of anticipation requires the disclosure in a single reference of every element of the claimed invention. (Citations omitted.) Moreover, it is incumbent upon the examiner to identify wherein each and every facet of the claimed invention is disclosed in the applied reference. (Citation omitted; emphasis added.)

That is, the Examiner has the initial duty of supplying the factual basis for the rejection advanced and the Examiner may not, because the Examiner doubts the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. *In re Warner*, 154 USPQ 173 (CCPA 1967). It is respectfully submitted that the Examiner's nominal comments/guidance in support of the present rejection do not comply with the Examiner's burden to support the rejection. More particularly, at minimum, the past and pending rejections represent a non-exhaustive listing of the facets of the claimed invention unidentified within the applied reference, and/or the speculation, unfounded assumptions or hindsight reconstruction.

The Office Action alleges that Sen discloses means for parameterizing the predetermined set of test compounds, and means for performing a space-filling design of the parameterized predetermined set of test compounds. This is not the case, however.

Sen discloses a procedure that is focused on the possible interactions between four components. See Abstract. Sen's statistical optimization focuses on certain media components (4 in total) "which have been reported to play a very significant role in enhancing the production of surfactin." As the Examiner can fully appreciate, the components selected by Sen have been used in fermentation media for years. This clearly explains how Sen was able to select components known to

enhance the production of surfactin. The reference mentions dissolved oxygen concentration as another possible component, but does not use this compound because of monitoring difficulties. See page 264, column 1, lines 12-26. In fact, Sen acknowledges existence of some of the problems addressed by the instant invention in stating that "carrying out experiments with every possible factorial combination of the test variables is impractical because of the large number of experiments required." Id., lines 31-34. Sen also teaches away from the instant invention by utilizing four test compounds in the culture media. The reference discusses the inefficiencies associated with conventional optimization methods that involve changing one variable at a time. The one-dimensional aspect of conventional methodologies is considered to be time-consuming and incapable of determining optimal conditions. Id., lines 27-31.

Independent claim 128 requires that the space-filling design be performed to identify a plurality of first test compounds that are a subset of the original predetermined set of test compounds. Further, the space-filling design is performed with respect to the parameters determined for each of the test compounds.

Sen does not perform a space-filling design with respect to any parameter determined for each test compound. Rather, Sen selects compounds that have already been identified in the literature to provide enhanced results. The "space-filling design" performed by Sen does not identify a plurality of first test compounds that is a subset of the predetermined set of test compounds. The components used by Sen are unrelated compounds that lack common building blocks. Therefore, any alleged "space-filling design" performed by Sen would likely fail to identify further compounds to be tested to improve results.

Sen's "space-filling design" is actually performed on the concentration parameter of four different test compounds within the culture medium in order to determine optimal concentrations. Sen is completely silent about identification of new compounds based on the "space-filling design." Sen discloses the results of 30 runs in table 2. The majority of these runs (26) cannot qualify as a subset, at least in part, because they contain the same four compounds. The remaining four runs include 3 of the 4 compounds.

Independent claim 128 also requires construction of a first test library that contains a plurality of first culture media wherein each culture media contains a single first test compound previously identified using the space-filling design. The Office Action appears to be completely silent on where Sen discloses this particular feature, which is explicitly recited in the claim. In fact, review of Sen clearly shows that the resulting culture media include multiple test compounds with varying concentrations of the same compounds. Table 2 reveals that each culture medium contains at least three different test compounds. These test compounds are also not obtained through the space-filling design. Additionally, the properties measured by Sen are obtained by varying the concentration of multiple compounds within the culture media. Since Sen utilizes the same compounds within the culture media, it appears as though Sen actually teaches away from the claimed invention which utilizes a different test compound in each culture medium.

Independent claim 128 requires derivation of a quantitative relationship between a measured indicia of a first culture media and at least one parameter of the first test compounds. As Applicants have aptly described in previous correspondence regarding the instant application, the claimed invention measures the same parameters in each of the predetermined set of test compounds. In

contrast, Sen measures a different parameter in each of the four compounds used. Thus, the regression formula applied by Sen would only correspond to those four test compounds and corresponding parameters. If a new compound were introduced, for example, the regression formula could not be applied because there would be no coefficient corresponding to a property of the new compound. This is to be expected because Sen does not parameterize test compounds as set forth in the claimed invention. It is simply not possible for Sen to use this relationship to predict any information regarding unknown test compounds.

Next, independent claim 128 provides means for identifying a candidate library that contains a plurality of candidate culture media having an estimated indicia that satisfies a test requirement. Each candidate culture medium contains at least one test compound, from the predetermined set of test compounds, that is not in the first test library. The estimated indicia for each candidate culture medium is determined through calculation using the derived quantitative relationship. The Office Action alleges that Sen discloses determination of the optimal concentration of components to arrive at predicted media components. However, Sen is only able to vary the concentration of known media components. It is not possible for Sen to predict any values corresponding to components that are not in the first test library. Applicants further note that Sen appears to be completely silent on applying the derived relationship to predict values of unknown compounds. In any event, Sen would necessarily have to re-derive the regression equation to account for any new compound, since the regression equation is specific to the original four compounds. Finally, Sen is completely silent on identifying a second test library.

Sen clearly fails to disclose numerous features recited in independent claim 128, such as:

means for parameterizing said predetermined set of test compounds by determining at least one parameter for each test compound in said predetermined set of test compounds;

means for performing a space-filling design of the parameterized predetermined set of test compounds to identify a plurality of first test compounds, wherein said plurality of first test compounds is a subset of said predetermined set of test compounds;

means for constructing a first test library containing a plurality of first culture media, each said first culture media containing a respective first test compound identified using said space-filling design;

means for deriving a quantitative relationship between a measured indicia of a property of said plurality of first culture media and at least one parameter of said plurality of first test compounds;

means for identifying a candidate library containing a plurality of candidate culture media having an estimated indicia that satisfies a test requirement, wherein each said candidate culture medium contains a respective test compound from said predetermined set of test compounds that is not in said first test library, and wherein said estimated indicia is calculated using said derived quantitative relationship; and

means for identifying a second test library containing candidate culture media having a measured indicia that satisfies said test requirement.

It is therefore respectfully submitted that independent claim 128 is allowable over the art of record.

Claims 120-122 depend from independent claim 128, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 128. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

V. Rejections under 35 USC §103

Claims 120-122, 124-126, 128, and 129 were rejected under 35 USC §103(a) as being unpatentable over Sen.

Independent claim 129 defines a computer program product tangibly embodying a program of instructions executable by a machine. The program of instructions causes the machine to perform the steps of:

- identifying a predetermined set of test compounds;
- parameterizing the predetermined set of test compounds by determining at least one parameter for each test compound in the predetermined set of test compounds;
- performing a space-filling design of the parameterized predetermined set of test compounds to identify a plurality of first test compounds, wherein the plurality of first test compounds is a subset of the predetermined set of test compounds;
- constructing a first test library containing a plurality of first culture media, wherein each of the first culture media contains a respective first test compound;
- deriving a quantitative relationship between a measured indicia of a property of the plurality of first culture media and at least one parameter of the plurality of first test compounds;
- identifying a candidate library containing a plurality of candidate culture media having an estimated indicia that satisfies a test requirement, wherein each candidate culture medium contains a respective test compound from the predetermined set of test compounds that is not in the first test library, and wherein the estimated indicia is calculated using the derived quantitative relationship; and
- identifying a second test library containing candidate culture media having a measured indicia that satisfies the test requirement.

The program instructions of independent claim 129 corresponds to the acts performed by the apparatus of independent claim 128. As previously discussed, the art of record simply fails to disclose or suggest many of these features.

It is therefore respectfully submitted that independent claim 129 is allowable over the art of record.

Claims 124-126 depend from independent claim 129, and are therefore believed allowable for at least the reasons set forth above with respect to

independent claim 129. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

VI. Conclusion

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

AUTHORIZATION

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 1385.45510VX2).

Respectfully submitted,
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